PAPER ID-411464

Subject Code: REE101

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM I) THEORY EXAMINATION 2021-22
BASIC ELECTRICAL ENGG

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

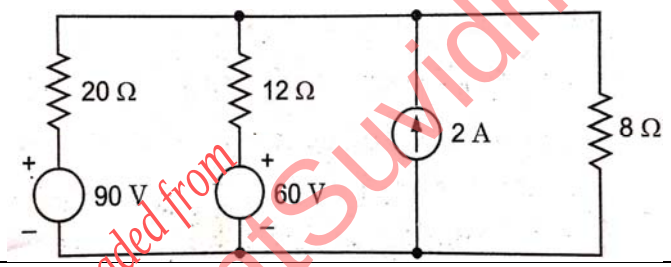
SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a.	Compare active and passive elements with examples.	BL-2
b.	Determine the form factor and peak factor of pure sine wave voltage of 220 Volt.	BL-3
c.	Why series resonant circuit is known as acceptor circuit & parallel resonant circuit as rejecter circuit?	BL-1
d.	What the relationship between line and phase, voltage and current for a 3-Φ star connected balanced system?	BL-2
e.	What is the condition of maximum efficiency of single transformer?	BL-1
f.	Write the applications of split ring and brush in DC machines.	BL-1
g.	A 3-phase 440 V, 50 Hz induction motor has a 4% slip. What will be the frequency of the rotor current?	BL-3

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a.	Find the current in 8Ω resistance using nodal analysis. 	BL-3
b.	Explain series resonance in R-L-C circuit. A series R-L-C circuit has R=10 Ω, L=0.1H and C=8μF. Determine (i) resonant frequency (ii) Q factor of the circuit at resonance (iii) the half power frequencies.	BL-4
c.	Find the relationship between line and phase, voltage and current for a 3-Φ delta connected balanced system. A balanced 3-Phase star connected load takes 30KW at a leading current of 48A from a 3-ϕ source of 500V, 50Hz. Find the circuit parameters per phase.	BL-4
d.	Establish the analogy between electric circuit and magnetic circuit.	BL-5
e.	Draw and explain the torque-slip characteristics of a 3-Φ induction motor indicating the starting torque, the maximum torque and operating region.	BL-4

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a)	Formulate the average value, rms value & form factor and peak factor of half wave rectified alternating current having maximum value of 100 A.	BL-5
(b)	Using mesh analysis, find the current through 6 Ω resistances in the following circuit.	BL-3

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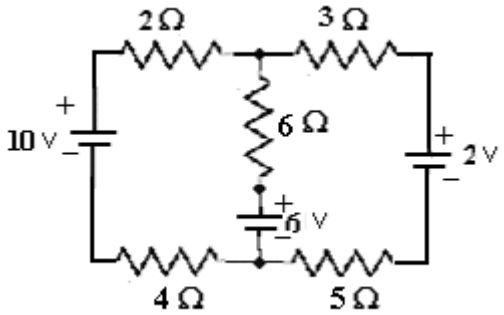
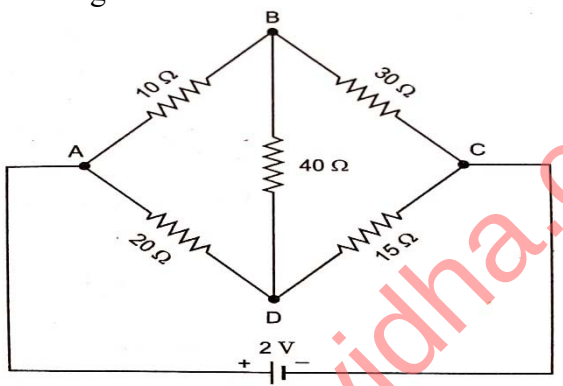


4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	State and Explain Thevenin`s theorem and find the current in 40 Ω resistance in the following network using Thevenin`s theorem. 	BL-4
(b)	Explain the causes of low power factor. What are the disadvantages of low power factor? Explain any two methods to improve the power factor.	BL-2

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	A balanced star connected load of (8 + j6) Ω per phase is connected to a balanced 3- phase, 400 V supply. Find the line current, phase current, power factor, power and total volt-amperes.	BL-3
(b)	Explain the construction details and working of a Permanent magnet moving coil PMMC instruments along with the deflecting torque and controlling torque.	BL-2

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain the working principle and emf equation of transformer. A 40 KVA transformer has iron loss of 450W and full load copper loss of 850W. if the power factor of the load is 0.8 lagging, calculate: (i) Full load efficiency (ii) The load at which the maximum efficiency occurs and (iii) The maximum efficiency.	BL-4
(b)	Explain single phase auto transformer and give its advantages over two winding transformers. Mention the various applications of auto transformer.	BL-2

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Why synchronous motor is not self-starting? Discuss any two methods to start the synchronous motor. What are the various applications of synchronous motor?	BL-5
(b)	(i) Why 1-Φ induction motor is not self-starting? Discuss any one method of starting. (ii) A 250 V dc shunt motor takes 41 A at full load. Armature resistance and shunt field winding resistances are 0.1 Ω and 250 Ω respectively. Find the back emf on full load.	BL-3